## IN THE CLAIMS

Please cancel claims 21 and 22 without prejudice or disclaimer, and amend claims 10, 12, 20, 50, 55, 59, 66 and 76, as follows:

Claims 1-6. (Canceled)

7. (Previously Presented) A cathode for an electron tube, comprising:

a metal base; and

an electron-emitting material layer coated on the metal base, said electron-emitting material layer comprising a needle-shaped conductive material;

said needle-shaped conductive material being at least one material selected from a group consisting essentially of carbon, indium tin oxide, nickel, magnesium, rhenium, molybdenum and platinum;

said needle-shaped conductive material being a carbonaceous material, said needle-shaped conductive material being in a range of 0.01 to 30% by weight based on a total weight of said electron-emitting material layer, and a thickness of said electron-emitting material layer being in a range of 30 to 80 μm.

Claims 8-9. (Canceled)

10. (Currently Amended) A cathode for an electron tube, comprising:

a metal base; and

an electron-emitting material layer coated on the metal base, said electron-emitting material layer comprising a needle-shaped conductive material and having a surface roughness, corresponding to a distance between a highest point and a lowest point on a surface of the electron-emitting material layer, [[being]] which is less than 10 microns;

wherein said needle-shaped conductive material in the electron-emitting material layer is in a range of 0.01 to 30% by weight based on a total weight of said electron-emitting material.

Claim 11. (Canceled)

12. (Currently Amended) A cathode for an electron tube, comprising:

a metal base; and

an electron-emitting material layer coated on the metal base, said electron-emitting material layer comprising a needle-shaped conductive material;

said needle-shaped conductive material being at least one material selected from a group consisting ~~essentially~~ of ~~indium tin oxide,~~ nickel, ~~magnesium,~~ rhenium, molybdenum and platinum.

Claims 13-19. (Canceled)

20. (Currently Amended) A cathode for an electron tube, comprising:

a metal base;

an electron-emitting material layer coated on the metal base, said electron-emitting material layer comprising a needle-shaped conductive material and having a surface roughness, corresponding to a distance between a highest point and a lowest point on a surface of the electron-emitting material layer, [[being]] which is less than 10 microns; and

a metal layer including nickel grains having sizes smaller than sizes of grains in said metal base, said metal layer being formed between said metal base and said electron-emitting material layer;

said metal layer further including at least one metal selected from a group consisting of aluminum (Al), tantalum (Ta), chromium (Cr), magnesium (Mg), silicon (Si) and zirconium (Zr).

Claims 21-28. (Canceled)

29. (Previously Presented) An oxide cathode for an electron tube, comprising:

a metal base; and

an electron-emitting material layer coated on the metal base, said electron-emitting material layer comprising a needle-shaped conductive material;

said needle-shaped conductive material being at least one material selected from a group consisting essentially of carbon, indium tin oxide, nickel, magnesium, rhenium,

molybdenum and platinum;

said needle-shaped conductive material being a carbonaceous material, said needle-shaped conductive material being in a range of 0.01 to 30% by weight based on a total weight of said electron-emitting material layer, and a thickness of said electron-emitting material layer being in a range of 30 to 80 μm.

Claims 30-47. (Canceled)

48. (Previously Presented) A cathode, comprising:

a metal base;

layer means disposed upon said metal base for emitting electrons; and

additional means for providing electrically conducting paths through said layer means for emitting electrons, said additional means comprising a needle-shaped electrically conductive material having a specific resistance not greater than $10^{-1}$ ohms centimeter, and comprising 0.01% by weight to 30% by weight of said layer means.

49. (Previously Presented) The cathode of claim 48, further comprising a metal layer exhibiting a grain size smaller than said metal base and interposed between said metal base and said layer means.

50. (Currently Amended) The cathode of claim 48, said needle-shaped conductive

material being selected from a group consisting ~~essentially~~ of ~~carbon, indium tin oxide,~~ nickel, ~~magnesium,~~ rhenium, molybdenum and platinum.

51. (Previously Presented) A cathode, comprising:

a metal base;

a layer of electron-emitting material disposed upon said base; and

a needle-shaped electrically conductive material providing electrically conductive paths disposed throughout said layer of electron-emitting material;

said needle-shaped electrically conductive material having a specific resistance not greater than $10^{-1}$ ohms centimeter.

52. (Previously Presented) The cathode of claim 51, further comprising a metal layer exhibiting a grain size smaller than said metal base and interposed between said metal base and said layer of electron-emitting material.

53. (Previously Presented) The cathode of claim 51, said conductive material comprising 0.01% by weight to 30% by weight of said layer of electron-emitting material.

Claim 54. (Canceled)

55. (Currently Amended) The cathode of claim 51, said layer of electron-emitting

material having a surface roughness, corresponding to a distance between a highest point and a lowest point on a surface of the electron-emitting material, [[being]] which is less than 10 microns.

Claim 56. (Canceled)

57. (Previously Presented) A cathode, comprising:

a metal base; and

a layer disposed upon said metal base;

said layer comprising an electron-emitting material, and a needle-shaped electrically conductive material disposed within said layer and having a specific resistance less than a specific resistance of said electron-emitting material.

58. (Previously Presented) The cathode of claim 57, said needle-shaped electrically conductive material providing electrically conductive paths in said layer.

59. (Currently Amended) The cathode of claim 57, said layer having a surface roughness, corresponding to a distance between a highest point and a lowest point on a surface of the electron-emitting material, [[being]] which is less than 10 microns.

60. (Previously Presented) The cathode of claim 57, said conductive material having

a specific resistance not greater than $10^{-1}$ ohms centimeter.

61. (Previously Presented) The cathode of claim 57, said layer having a thickness in a range of 30 microns to 80 microns.

62. (Previously Presented) The cathode of claim 57, said conductive material comprising 0.01% by weight to 30% by weight of said layer.

63. (Previously Presented) A cathode, comprising:

a metal base; and

a layer disposed upon said base;

said layer comprising an electron-emitting material, and a needle-shaped electrically conductive material having a specific resistance not greater than $10^{-1}$ ohms centimeter.

64. (Previously Presented) The cathode of claim 63, further comprising a metal layer having a grain size smaller than a grain size of said metal base, and interposed between said metal base and said layer.

65. (Previously Presented) The cathode of claim 63, said conductive material comprising 0.01% by weight to 30% by weight of said layer.

66. (Currently Amended) The cathode of claim 63, said layer having a surface roughness, corresponding to a distance between a highest point and a lowest point on a surface of the electron-emitting material, [[being]] which is less than 10 microns.

67. (Previously Presented) The cathode of claim 63, said layer of electron-emitting material having a thickness in a range of 30 microns to 80 microns.

68. (Previously Presented) A cathode, comprising:

a metal base;

a layer of electron-emitting material including an electron-emitting barium-based alkali-earth metal carbonate material disposed upon said base; and

a needle-shaped electrically conductive material providing electrically conductive paths in said layer of electron-emitting material;

said conductive material having a specific resistance not greater than $10^{-1}$ ohms centimeter.

69. (Previously Presented) The cathode of claim 68, further comprising a metal layer having a grain size smaller than a grain size of said metal base, and interposed between said metal base and said layer of electron-emitting material.

70. (Previously Presented) The cathode of claim 68, said conductive material

comprising 0.01% by weight to 30% by weight of said metal layer.

Claim 71. (Canceled)

72. (Previously Presented) A cathode, comprising:

a metal base; and

a layer formed on said base from a carbonate paste comprising a barium-based carbonate electron-emitter and a needle-shaped electrically conductive powder;

said needle-shaped electrically conductive powder having a specific resistance not greater than $10^{-1}$ ohms centimeter.

73. (Previously Presented) The cathode of claim 72, further comprising a metal layer having a grain size smaller than a grain size of said metal base and interposed between said metal base and said layer.

74. (Previously Presented) The cathode of claim 72, said needle-shaped electrically conductive powder comprising 0.01% by weight to 30% by weight of said layer.

Claim 75. (Canceled)

76. (Currently Amended) The cathode of claim 72, said layer having a surface

roughness, corresponding to a distance between a highest point and a lowest point on a surface of the layer, [[being]] which is less than 10 microns.

Claims 77-79. (Canceled)